EXHIBIT 7

EXHIBIT A

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
WACO DIVISION

CUTTING EDGE VISION, L.L.C.	)	
	)	
Plaintiff	)	
	)	
vs.	)	Case No. 6:22-CV-00285-ADA
	)	
TCL TECHNOLOGY GROUP CORPORATION, TCL ELECTRONICS HOLDINGS LIMITED, TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED, and TCL COMMUNICATIONS LIMITED	)	
	)	
Defendants.	)	

EXPERT DECLARATION OF DAVID W. HUGHES

1. I, David W. Hughes, submit this Expert Declaration in the matter of Cutting Edge Vision, L.L.C. ("CEV") versus TCL Technology Group Corporation; TCL Electronics Holdings, Ltd.; TCL Communication Technology Holdings, Ltd.; and TCL Communications, Ltd. (individually and collectively "TCL"), Case No. 6:22-CV-00285-ADA.

2. As at least part of this action, I understand that TCL has disputed the meanings of eight words and phrases that appear in certain asserted claims of U.S. Patent No. 10,063,761 entitled "Automatic Upload Of Pictures From A Camera" ("the '761 Patent"); and in certain asserted claims of U.S. Patent No. 11,153,472 entitled "Automatic Upload Of Pictures From A Camera" ("the '472 Patent").

3. I further understand that Ryan Garlick has submitted a Declaration ("Garlick") in support of TCL's position as regards the meanings of six of the eight words and phrases identified by TCL and that appear in certain claims of the '761 and the '472 Patents-in-suit.

4. This Expert Declaration contains my initial opinions concerning the proper meanings of the eight words and phrases disputed by TCL.

QUALIFICATIONS

5. I hold the degrees Bachelor of Electrical Engineering (1975), Master of Science in Electrical Engineering (1976), and Doctor of Philosophy in Electrical Engineering (1980) from the Georgia Institute of Technology ("Georgia Tech"). I received the Sigma Xi Award for the Outstanding Dissertation in Engineering at Georgia Tech. I have an educational background and work experience in various aspects of electrical engineering, including that germane to the cellular telephones and electronic cameras at issue in the present litigation. I have been employed by, or have consulted with, the electronics industry since the late 1970s.

6. In 1980, I joined Motorola as a semiconductor engineer in the Semiconductor Products Sector. I worked on semiconductor processing and electronic circuit design issues. I also participated as a negotiation assistant in patent licensing meetings, and as an in-house consultant supporting patent and product litigation. I received the Motorola Engineering Achievement Award once and the Motorola Award of Excellence three times.

7. In 1985, I accepted a position at the Georgia Tech Research Institute performing research and development in the area of semiconductor electronics. In 1991, I co-founded an engineering consulting and investment banking firm specializing in proprietary technologies. My work at this venture involved assisting clients with creating, protecting, and analyzing their technology assets. In this role, I worked extensively with patents and other forms of intellectual property. Since 1995, I have worked as an independent consultant. My curriculum vitae is included as Exhibit 1.

8. I have published more than fifty technical articles, and written two electrical engineering textbook sections, two sections for respective books about American speleology, and one chapter in a book about aerospace history. I have also authored four complete books, and have another book in progress. I am a named inventor on 13 United States patents and one foreign patent.

9. The bulk of my current work relates to technologies in the field of electrical engineering and the associated intellectual property issues.

10. I have served as an expert in several patent litigation actions. I have testified as an expert by deposition within the preceding four years.

COMPENSATION

11. I am being compensated for my study and analysis activities in this matter at my current standard rate of $425 per hour, plus expenses. I have no known financial interest in either party and my compensation in this matter is not dependent upon the outcome of the present proceeding.

DATA CONSIDERED

12. The data or other information that I considered in forming the opinions that I may express in this phase of the action include those detailed in the listing that follows:

a. U.S. Patent No. 10,063,761 entitled "Automatic Upload Of Pictures From A Camera"; filed November 24, 2015; issued August 28, 2018.

b. U.S. Patent No. 11,153,472 entitled "Automatic Upload Of Pictures From A Camera"; filed October 25, 2019; issued October 19, 2021.

c. Portions of the prosecution history of U.S. Application No. 15/188,736 (that matured into U.S. Patent No. 9,936,116); bearing Bates numbers CEV-0031305 through CEV-0031319; Bates numbers CEV-0031286 through CEV-0031292; and Bates numbers CEV-0031280 through CEV-0031285.

d. Prosecution history of U.S. Application No. 14/950,370 (that matured in U.S. Patent No. 10,063,761); bearing Bates numbers CEV-0030587 through CEV-0031240.

e. Prosecution history of U.S. Application No. 16/663,742 (that matured in U.S. Patent No. 11,153,472); bearing Bates numbers CEV-0001846 through CEV-0015637.

f. Defendants' Updated List Of Proposed Terms For Construction, October 20, 2022.

g. Defendants' Proposed Construction For The Proposed Terms, October 31, 2022.

h. Defendants' Opening Claim Construction Brief, November 21, 2022.

i. Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, November 21, 2022.

j. Deposition transcript of Dr. Ryan Garlick taken on December 2, 2022 ("the Garlick Deposition"), and Exhibits 10, 11, 11A, and 12 entered during that deposition.

k. Claim Construction Order, *True Chemical Solutions, L.L.C. vs. Performance Chemical Company*, Western District Of Texas, Midland Division, MO-18-CV-00078-ADA, September 25, 2019.

l. Claim Construction Order, *Flypsi, Inc. vs. Dialpad, Inc.*, Western District Of Texas, Waco Division, 6:21-CV-00642-ADA, August 22, 2022.

m. Claim Construction Order, *Barkan Wireless IP Holdings, L.P. v. Samsung Elecs. Co.*, Case No. 2:18-CV-28-JRG (E.D. TX, Feb 7, 2019).

n. Steven M. Kaplan, *Wiley Electrical And Electronics Engineering Dictionary*, John Wiley & Sons, Hoboken, New Jersey, 2004; bearing Bates numbers CEV-0035871 through CEV-0035880.

o. Rudolf F. Graf, *Modern Dictionary Of Electronics*, Seventh Edition, Butterworth-Heinemann, Woburn, Massachusetts, 1999; bearing Bates numbers CEV-0035602 through CEV-0035608.

p. Michael Agnes, *Webster's New World College Dictionary*, Fourth Edition, Wiley Publishing, Cleveland, Ohio, 2004; bearing Bates numbers CEV-0035859 through CEV-0035870.

q. Bryan Pfaffenberger, *Webster's New World Computer Dictionary*, Ninth Edition, Hungry Minds, New York, New York, 2001.Bryan Pfaffenberger, *Webster's New World Computer Dictionary*, Ninth Edition, Hungry Minds, New York, New York, 2001.

r. Jane Radatz, *The IEEE Standard Dictionary Of Electrical And Electronics Terms*, Sixth Edition, 1996; bearing Bates numbers CEV0035609 through CEV0035614.

s. U.S. Patent No. 6,021,278 entitled "Speech Recognition Camera Utilizing A Flippable Graphics Display"; filed July 30, 1998; issued February 1, 2000; (marked as Exhibit PX 0012 during the Garlick Deposition).

t. U.S. Patent No. 6,101,338 entitled "Speech Recognition Camera With A Prompting Display"; filed October 9, 1998; issued August 8, 2000.

13. If I am asked to submit a document in response to an expert report, a declaration, or a pleading offered by TCL, there may be additional data considered.

THE PATENTS-IN-SUIT

14. The '761 and '472 Patents are part of a portfolio of patents that all share the same substantive disclosure, which was originally filed on October 17, 2005. Accordingly, I have applied the date of the original application (October 17, 2005) in determining the appropriate date for the person of ordinary skill in the art ("POSITA"), as that term is used and described below.

15. For convenience and consistency, I endeavor to employ in this Declaration the columns and lines numbers of the '472 Patent when referring to the specification of the patents-in-suit. On the other hand, I will refer to the respective columns and line numbers of the '761 Patent for any issues unique to the '761 Patent.

16. I understand that the asserted patent claims generally relate to a camera system that automatically uploads pictures over a cellular network to a picture hosting site when certain conditions exist. The asserted patent claims include a touch sensitive display that allows the user of the camera system to select an option or input to confine the automatic uploads to periods without potential cellular network access fees ('761 Patent, Claim 1) or to periods without potentially increased cellular network access fees ('472 Patent, Claims 1 and 5).

17. I have been informed by counsel that Claims 1-4 and Claim 16 from the '761 Patent have been asserted in the present action. Similarly, I understand that Claims 1-2 and Claims 5-6 from the '472 Patent have been asserted in the present action.

Person Of Ordinary Skill In The Art

18. I understand from counsel that patent claims should be construed from the perspective of a hypothetical person having ordinary skill in the relevant art ("POSITA"). I also understand that the level of skill in the art may be evidenced by references published at or around the time of the filing of the patent or patents under consideration. In performing my analysis, I have applied the level of ordinary skill in the art based upon such guidance.

19. The field of the inventions claimed in the patents-in-suit is set forth in Paragraph 16 above. In my opinion, a person of ordinary skill in the relevant art would possess a Bachelor of Engineering degree or a Bachelor of Science degree in Engineering or Computer Science and, in addition, have approximately three or more years of related work experience. My own credentials include those of such a person.

Principles Of Claims Construction

20. I understand from counsel that when determining the meaning of patent claim terms one should begin by considering the intrinsic evidence. The intrinsic evidence includes the claims

themselves, the specification of the patent, the prosecution history of the application that matured into the patent, and the respective prosecution histories of related patents addressed to the same subject matter.

21. I also understand that there is a heavy presumption that claim terms are to be given their plain-and-ordinary meaning. The plain-and-ordinary meaning is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention. For this present Declaration, I was instructed to provide my analysis from the perspective of a person of ordinary skill in the art as of the time that the original parent application was filed—namely, October 17, 2005.

22. Further, I understand that a claim term's context in the associated patent claim can be instructive when ascertaining the proper meaning of that term. Also, other asserted or unasserted claims can aid in determining the claim's meaning.

23. Counsel has informed me that there are only two exceptions to the general rule that claims are to be construed according to their plain-and-ordinary meaning. These exceptions are (1) when the patentee has acted as his own lexicographer, or (2) when the patentee has expressly and unambiguously disavowed in the intrinsic record the full scope of a claim term.

Indefiniteness

24. I understand from counsel that patent claims must particularly point out and distinctly claim the subject matter regarded as the invention, which requires a claim, when viewed in light of the intrinsic evidence, to "inform those skilled in the art about the scope of the invention with reasonable certainty." Whether or not a claim is "indefinite" is determined from the perspective of a person of ordinary skill in the art as of the time that the application was filed and in light of the specification.

25. I am instructed that indefiniteness must be proven by "clear and convincing evidence," which is more rigorous to meet than the "preponderance of evidence" standard. The "clear and convincing" legal standard means that the evidence being presented must be highly and substantially more probable to be true rather than untrue, while "preponderance of evidence" requires that the evidence be "more likely than not" to prove the matter at hand.

Means-Plus-Function

26. I am instructed that, unless the word "means" is used regarding the claim term at issue, a rebuttable presumption arises that the term is not means-plus-function. Further, I am instructed that a term may be defined in terms of means-plus-function if a term lacks specific structure by its language, or if a function is listed without an accompanying term that provides sufficient structure.

27. I was asked to review and consider the Court's decision in *True Chem. Sols., LLC v. Performance Chem.*, Co., No. 18 Civ. 00078, Pages 11-12 (W.D. Tex. Sep. 25, 2019). In that case, the Court held that "controller" is not a means-plus-function element because "[t]o a POSITA with a background in electrical engineering, a controller is a well-known and well-understood term that refers to an electrical device (*e.g.*, system-on-a-chip ("SoC") or application-specific integrated circuit ("ASIC")) that controls the operation of other components in the system". (both parenthetical insertions in the original).

28. I was also asked to consider *Barkan Wireless IP Holdings, L.P. v. Samsung Elecs. Co.*, Case No. 2:18-CV-28-JRG (E.D. TX, Feb 7, 2019), where at Pages 23-25 the Court declined to construe "controller" as means-plus-function, in part because the evidence showed that "controller" refers to a known class of structures.

29. Finally, I am instructed that when a term is defined under means-plus-function, it is indefinite if the patent does not properly specify the structure which performs the function and sufficiently tie the structure to that function.

Incorporation By Reference

30. I am advised that material may be incorporated by reference into a patent specification by reference to a U.S. patent or to a U.S. patent application publication. An incorporation by reference must be set forth in the patent specification and must: (1) express a clear intent to incorporate by reference by using the root words "incorporat(e)" and "reference" (e.g., "incorporate by reference"); and (2) clearly identify the referenced patent, application, or publication. I am also advised that information incorporated by reference is as much a part of the application as filed as if the text was repeated in the application, and should be treated as part of the text of the application as filed.

31. I am prepared to offer the following opinions at an evidentiary hearing or at trial, with the bases and reasons explained below.

"**Controller**"

32. Defendants contend that "the phrase 'controller' that is 'configured to' perform several functions is indefinite in the context of the claims" (Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 38, November 21, 2022). In my opinion, and as explained below, Defendants are incorrect.

33. Defendants' expert Dr. Garlick goes on to contend that a "means-plus-function" limitation should apply to the term "controller". (see, Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraphs 39-40, November 21, 2022). As such, I have been requested by counsel to review the relevant materials (including Dr. Garlick's

Declaration) in order to inform my own opinion as to whether the term "controller" would be understood by a POSITA as a class of known structures.

34. The word "controller" appears twice in '761 Patent, asserted Claim 1. In particular, the word "controller" appears in '761 Patent, asserted Claim 1 at Column 16, Line 65 and again in '761 Patent, asserted Claim 1 at Column 17, Line 9. Similarly, the word "controller" appears twice in '472 Patent, asserted Claim 1. In particular, the word "controller" appears in '472 Patent, asserted Claim 1 at Column 17, Line 11 and again in '472 Patent, asserted Claim 1 at Column 17, Line 25. Finally, the word "controller" appears in '472 Patent, asserted Claim 5 at Column 18, Line 9 and again in '472 Patent, asserted Claim 5 at Column 18, Line 28.

35. To begin, my review of the intrinsic record for the patents-in-suit revealed that CEV expressly stated during prosecution that it did not intend for any claim elements to be interpreted as means-plus-function. For instance, in the application that matured into the '761 Patent-in-suit, CEV made the following statement:

> "Applicant has taken care to prepare the claims in a manner that does not fall within 35 U.S.C. Section 112, Para. 6. Specifically, Applicant has undertaken to draft the claims in a manner that recites structure, material, or acts in support of the various operations. Applicant requests that the Examiner inform Applicant if he believes that any claim falls within 35 U.S.C. Section 112, Para. 6, so that appropriate amendments can be made."
>
> (Patent Application No. 14/950,370; Preliminary Amendment, Page 10, Lines 18-22, November 24, 2015; page bearing Bates number CEV-0030933).

Similarly, CEV submitted this same statement in the application that matured into the '472 Patent-in-suit. (see, Patent Application No. 16/663,742; Preliminary Amendment, Page 8, Lines 33-38, October 25, 2019; page bearing Bates number CEV-0015418).

36. In my experience as an electrical engineer, the word controller describes a class of known structures, namely a device or group of devices that controls the operation of other components of a system. In my opinion, the POSITA would have shared this same understanding.

37. Moreover, the context of the claims themselves is consistent with my experience and helps to inform my opinion:

a. For instance, Claims 1 and 5 of the '472 Patent each recite "a controller coupled to the cellular interface, the non-volatile local memory and the touch sensitive display". A cellular interface, a non-volatile local memory, and a touch sensitive display are all themselves hardware devices that, in turn, are coupled to the recited controller. A POSITA would thus conclude that the controller coupled to those hardware devices necessarily includes a hardware structure.

b. However, my review of Dr. Garlick's Declaration reveals that, at his Paragraph 40, he cropped from his quotation of the patent claims language the hardware elements listed in Paragraph 37a above in this present Declaration. Then, after cropping the hardware components from the claims elements, Dr. Garlick generically refers to the elements as "functions." (*Id.*) Specifically for the '472 Patent, Claim 1, Dr. Garlick at his Paragraph 40 ignores claims language stating that the controller is:

i. "coupled to the cellular interface, the nonvolatile local memory and the touch sensitive display".

ii. configured to receive "via the touch sensitive display, a user selection of an upload option".

iii. configured to automatically connect to a picture hosting service "that is internet-based".

iv. configured to enable an upload to the picture hosting service, "over the internet and via the cellular interface, of a group of image sensor-captured pictures stored in the local memory".

c. ’761 Patent, Claim 1 and ’472 Patent, Claim 5 contain similar recitations of hardware components that communicate with, or are coupled to, the controller.

d. I believe that the claims language that Dr. Garlick ignored is important, because it confirms the understanding of a POSITA that a controller is a specific hardware device that communicates with and controls other hardware devices of the system.

38. The specification of the patents-in-suit also supports this conclusion. For instance, the specification recites at ’472 Patent, Column 12, Lines 40-41 that the controller is “preferably a microprocessor.” In my personal and professional experience, a POSITA would have readily understood that a microprocessor is a well-known class of hardware device.

39. Indeed, I note that Dr. Garlick admitted during his deposition that a POSITA would have worked with commercially available microprocessors (listed on Exhibit 10 of his deposition) prior to 2006, and that those model numbers listed on Exhibit 10 “refer to specific microprocessor devices.” (Garlick Deposition, Pages 90-91). As such, a POSITA would have had no difficulty understanding that a microprocessor was referring to a well-known class of structures.

40. In addition, the specification of the patents-in-suit also expressly incorporates by reference three United States patents, stating:

> “Voice recognition techniques are well known in the art and have been applied to cameras, see for example, U.S. Pat. Nos. 4,951,079, 6,021,278 and 6,101,338 which are herein incorporated by reference.” (’472 Patent, Column 1, Lines 55-58).

41. Furthermore, two of those patents (namely, the ‘278 and ‘338 Patents, both issued to Bernardi) expressly explain that a particular chip, such as the Sensory RSC-164 chip, can be used for the microcontroller taught in those respective patents. For instance, the incorporated-by-reference ‘278 Patent (Exhibit PX 0012 of the Garlick Deposition) states:

"FIG. 4 is a block diagram of the voice recognition camera of the present invention. The user inputs voice commands through the microphone 30 and *the microcontroller 50, such as a Sensory RSC-164 chip*, recognizes the voice command and operates the intended function. Such voice recognition can be that as in U.S. Pat. No. 4,951,079. In the preferred embodiment, the microswitch 45 sends a signal to the microprocessor 50 for indicating the current state of the microswitch 45. If the microcontroller 50 determines that the microswitch 45 is activated, the image would be automatically rotated one hundred eighty degrees by the microcontroller 50, and then sent to the graphical display 35. If the microcontroller 50 determines that the microswitch 45 is not activated, the image would be sent to the graphical display 35 as normal." ('278 Patent, Column 3, Lines 21-34) (emphasis via italics added here).

42. Similarly, the incorporated-by-reference '338 Patent states:

"FIG. 4 is a block diagram of the voice recognition camera 10 of the present invention. The user inputs voice commands into the microphone 15, and the voice is amplified by the analog amplifier and data processing 35. A microcontroller 40 is programmed to recognize the voice command, and to send the initial prompting words to the prompting display 45. The microcontroller 40 is also programmed to signal the prompting display 45 to display the predetermined, preprogrammed pull-down menu when any of the initial words are received by the microcontroller 40 through via the microphone 15. *A chip such as a Sensory RSC-164 chip can be used for the microcontroller 40.* The microcontroller 40 sends voice commands as needed to the prompting display 45, which could be comprised of any of the aforementioned displays 20, 25, or 30. The digital memory 50 is used to store reference word sets to be used by the speech recognition algorithms, and for storage of data for the various prompting displays 45. User inputs 55 are user inputs such as a shutter button, zoom switch, or the like." ('338 Patent, Column 3, Lines 23-43) (emphasis via italics added here).

43. In addition, each of the patents-in-suit also expressly list in their respective tabulations of "References Cited - Other Publications" the "RSC-164i Datasheet, 'General Purpose Microcontroller Featuring Speech Recognition, Speaker Verification, and Speech Synthesis.' Sensory, Inc. (1996)." ('472 Patent, Page 15; '761 Patent, Page 4) (parenthetical insertion in the originals).

44. It is my opinion that a POSITA would have been aware of materials such as those that the inventor specifically incorporated by reference in his patent specification, including the RSC-164 family of controllers. This further confirms that a POSITA would have understood that the claimed "controller" was referring to a well-known and well-understood class of structures.

45. To further inform my opinion that the "controller" had a well understood and definite meaning to a POSITA, I consulted several technical dictionaries spanning the period from 1996 to 2004 that, in my opinion, are all consistent with the understanding of a POSITA. And, each of these technical dictionary definitions confirm that the word "controller" describes a well-known class of structures.

a. *The IEEE Standard Dictionary of Electrical and Electronics Terms*, Page 217, 1996; (page bearing Bates number CEV0035611) includes the following definitions of "controller": "(4) The component of a system that functions as the system controller. A controller typically sends program messages to and receives response messages from devices. (5) A functional unit in a computer system that controls one or more units of the peripheral equipment."

b. *Wiley Electrical And Electronics Engineering Dictionary*, Page 145, 2004; (page bearing Bates number CEV-0035876) includes the following definitions of "controller": "1. A circuit board or device which controls the way peripheral devices access the computer, and vice versa. It is usually contained on a single chip…2. A signal, circuit, device, or system which controls any given mechanism, function, process or piece of equipment…3. A circuit, mechanism, device, or system, which monitors one or more variables, and automatically makes the necessary adjustments in order to maintain operation within the specified parameters."

c. *Modern Dictionary Of Electronics*, Page 151, 1999; (page bearing Bates number CEV-0035606) includes the following definition: "controller...a device or group of

devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected."

46. Moreover, my opinion that a "controller" in the claims of the patents-in-suit describes a well-known class of structures is also consistent with Judge Albright's prior opinions. Please consider these recitations:

a. "...there is a presumption that Section 112(f) does not apply when the word 'means' (or another similar word) does not appear." (excerpted from Claim Construction Order; *True Chemical Solutions, L.L.C. vs. Performance Chemical Company*; Western District Of Texas; Midland Division; MO-18-CV-00078-ADA; Page 11, Lines 9-10; September 25, 2019) (parenthetical insertion in the original).

b. "...the court found that a 'controller' connoted sufficient structure to avoid a means-plus-function analysis." (excerpted from Claim Construction Order; *Flypsi, Inc. vs. Dialpad, Inc.*; Western District Of Texas; Waco Division; 6:21-CV-00642-ADA; Page 12, Lines 11-12; August 22, 2022).

c. "The court recognized that...'controller' belonged to a class of structures..." (excerpted from Claim Construction Order; *Flypsi, Inc. vs. Dialpad, Inc.*; Western District Of Texas; Waco Division; 6:21-CV-00642-ADA; Page 12, Lines 12-15; August 22, 2022).

d. "To a POSITA with a background in electrical engineering, a controller is a well-known and well-understood term that refers to an electrical device...or application-specific integrated circuit...that controls the operation of other components in the system." (excerpted from Claim Construction Order; *True Chemical Solutions,*

L.L.C. vs. Performance Chemical Company; Western District Of Texas; Midland Division; MO-18-CV-00078-ADA; Page 11, Lines 12-16; September 25, 2019).

47. I also considered *Barkan Wireless IP Holdings, L.P. v. Samsung Elecs. Co.*, Case No. 2:18-CV-28-JRG (E.D. TX, Feb 7, 2019), where at Pages 24-25 the Court declined to construe "controller" as means-plus-function term, relying in part on the following statements:

a. "Plaintiff has submitted technical dictionary definitions of 'controller,' thereby reinforcing that the term 'controller' refers to a known class of structures. (See Dkt. No. 85, Ex. *IBM Dictionary of Computing* 145 (1994) ("A device that coordinates and controls the operation of one or more input/output devices, such as workstations, and synchronizes the operation of such devices with the operation of the system as a whole."); see also id., Ex. H.1, *The IEEE Standard Dictionary of Electrical and Electronics Terms* 217 (6th ed. 1996); Dkt. No. 71, Ex. L, *Newton's Telecom Dictionary* 152 (11th ed. 1996) (BARKAN-00004292).)" (parenthetical insertions in the original).

b. "The Court therefore concludes that Defendants have failed to rebut the presumption against means-plus-function treatment, and Defendants have not presented any alternative proposed construction."

48. For at least the reasons detailed above, I am of the opinion that the word "controller" recited in the claims of the '761 and the '472 Patents-in-suit is not a "means" word, but instead describes a class of structures that were well known to those of ordinary skill in the art by 2005.

49. In the alternative, should the Court find that "controller" is a means-plus-function element, it is my opinion that the patent specification describes the structure that performs the claimed functions, and also sufficiently connects that structure to those claimed functions.

a. As an initial point, and as detailed above at Paragraph 38, the patent specification describes a microprocessor as one of the preferred examples of a controller.

b. Moreover, in their argument, Defendants cropped from the claims the very structure that performs the claimed operations. (see, for example, Paragraph 37 above). In fact, the claims specify that the touch sensitive display, the non-volatile memory, the cellular interface, and the camera system all work together with the controller to carry out the operations that Defendants challenge as allegedly functional. (see, for example, Paragraph 37 above). Thus, the plain language of the claims themselves recite the very structure (improperly cropped by Defendants) that is connected to the elements they assert are merely functions.

c. In addition, the incorporation by reference of the two Bernardi patents (see, for example, Paragraph 41 above) which expressly identify the RSC-164 family of controllers as a preferred controller would motivate the POSITA to consider the RSC-164 as a candidate "Camera Controller 40" in Figure 3 of the patents-in-suit.

"Instructs"

50. Defendants contend that the claim term "instructs" is indefinite. (see, Defendants' Opening Claim Construction Brief, Page 7, Line 21, November 21, 2022). In my opinion, and as explained below, Defendants are incorrect.

51. The word "instructs" appears in the '761 Patent asserted Claim 1 as "controller configured to…receive, via the touch sensitive display, a user selection of an upload option that ...instructs the device to..." (excerpted from '761 Patent, Column 16, Line 66 through Column 17, Line 2).

52. The word "instructs" appears in the '472 Patent asserted Claim 1 as a controller that is configured to "...receive, via the touch sensitive display, a user selection of an upload option that...instructs the camera system..." (excerpted from '472 Patent, Column 17, Lines 15-19).

53. The word "instructs" appears in the '472 Patent asserted Claim 5 as a controller that is configured to "...display on the touch sensitive display a user-selectable input that... instructs the camera system..." (excerpted from '472 Patent, Column 17, Lines 12-15).

54. Defendants do not identify any actual confusion or ambiguity with the word "instructs". They instead offer a non-technical characterization of "option" as "something passive, generally meaning something being chosen" (Defendants' Opening Claim Construction Brief, Page 8, Lines 5-6, November 21, 2022). They then assert that "[a] POSITA would be left to wonder how something that is passively being chosen can actively instruct others to perform." (Defendants' Opening Claim Construction Brief, Page 8, Lines 7-8, November 21, 2022).

55. As an initial point, Defendants' definition for "option" is not related to the technical field of the claims, and would not necessarily be accepted by a POSITA. Instead, a POSITA would more properly rely on something like the following recitation from Page 368 of *Webster's New World Computer Dictionary*, Ninth Edition 2001, which provides the following text when defining a "touch-sensitive display":

> "A display designed with a pressure-sensitive panel mounted in front of the screen. *One selects options by pressing the screen at the appropriate place*." (emphasis via italics added here).

56. In fact, a POSITA would consider the above text discussing a touch-sensitive display to be consistent with the deposition testimony of Dr. Garlick wherein he admits:

"Q. …You call the various radio buttons below options, correct? So you have no objection to me calling them options, do you?

A. No, no objection.

Q. And the *user selects an option by either clicking on, if it's a computer, or pressing on if it's a phone, the radio button*, correct?

A. The user selects one of those by clicking or pressing, yes."

(Garlick Deposition, Page 78) (emphasis via italics added here).

57. Dr. Garlick also admitted that "user options" are not passive, but are instead "active" as they allow the user to interact with the system to affirmatively perform a function. For instance consider this portion of Dr. Garlick's deposition testimony:

a. "A. So when a user selects one or the other option, a field is captured that collects that information that is then collected as part of the order process. So an order will see that either horizontal or vertical has been chosen." (Garlick Deposition, Page 63).

58. Similarly, consider the exchange below reproduced from Dr. Garlick's deposition testimony:

"Q. All right. So what's the purpose of having those buttons with functionality on a user interface?

A. There are elements for the user to interact with to perform some function." (Garlick Deposition, Page 57).

59. Further, and in my opinion, a POSITA would conclude that the *Webster's New World Computer Dictionary* language recited in Paragraph 55 above, and Dr. Garlick's testimony reproduced in Paragraphs 56-58 above, are each consistent with the specification of the patents-

in-suit and with the corresponding asserted claims from those patents. Indeed, recall that the patent specification discloses a number of different ways that a user can select menu icons or options. Consider, as some examples, the following teachings from the '472 Patent:

a. "Another aspect of the present invention provides that the camera LCD display (FIG. 1, element 14) employs touch sensitive technology. This technology is well known in the computer art and can be any of resistive, capacitive, RF, etc touch technology. This aspect of the present invention allows the user to interact with menus, features and functions displayed on the LCD display directly rather than through ancillary buttons or cursor control." ('472 Patent, Column 7, Lines 18-25) (parenthetical insertion in the original).

b. "When the icon is selected by whatever method, the EVF image shows a drop down menu of available camera modes, for example, portrait, landscape, fireworks, etc." ('472 Patent, Column 8, Lines 36-39).

c. "...the EVF (or LCD display) displays the menus as above and the user moves the cursor or mouse pointer around this image by use of his finger on the touchpad. This operation is virtually identical to that of the mouse in laptop computers and is well understood in the art." (excerpted from '472 Patent, Column 9, Lines 39-44) (parenthetical insertion in the original).

d. "In a second preferred embodiment of this aspect of the invention, the touchpad is placed on the back of the camera (FIG. 1 element 12b) and is operable for manipulated (*sic*) the cursor and menus shown on the LCD or EVF display. This provides a much more natural and computer-like interface to the camera system. It is also contemplated that either embodiment of this aspect of the invention may be

coupled with voice recognition so that the user may interact with the camera by touchpad manipulation in combination with voice commands. Additionally, combined with gaze tracking, the user can interact with the camera through touch, voice, and gaze (i.e., sight) to manipulate menus, control the camera system, compose the shot, focus, zoom, enable/disable flash, select macro or panoramic camera modes, etc." ('472 Patent, Column 10, Lines 24-37) (first and third parenthetical insertions in the original) (second parenthetical insertion added here).

e. "Still another contemplated embodiment applies the touch gesture recognition typically used with the computer-like touchpad technology to a touch sensitive display, such as the touch sensitive LCD of the camera and other devices herein disclosed that utilize an LCD display. Combining various aspects of the invention herein disclosed, such as voice recognition, touch input, gaze tracking, etc for camera control provides much more natural and human interfacing to the camera system for the control of camera menus, camera features, camera options, camera settings, commanding picture taking, enabling flash, etc." ('472 Patent, Column 14, Line 62 through Column 15, Line 6).

60. In addition, here are some usages of the word "instructs" (and variants) from the specification of the patents-in-suit that support a conclusion by a POSITA that a user selected option instructs the camera system:

a. "...instruct the camera to take the picture." (excerpted from '472 Patent, Column 5, Lines 36-37).

b. "...instruct the camera that this is also a picture taking command." (excerpted from '472 Patent, Column 5, Line 63 through Column 6, Line 2).

c. "...the inventive camera system is operable for being instructed to automatically initiate a connection to the internet, LAN, printer, etc. whenever the predetermined conditions are met…" (excerpted from '472 Patent, Column 12, Line 62 through Column 13, Line 1).

d. "...the inventive camera system can be instructed to automatically send the pictures to an email account, internet picture hosting site…web-based photo printing site…etc." (excerpted from '472 Patent, Column 13, Lines 22-27).

61. In my opinion, a POSITA would understand that each of the teachings recited above in Paragraph 60 describes electronically telling, ordering, or directing an electrical item to do something.

62. Also, in my opinion, a POSITA would understand that each of the teachings recited above in Paragraph 60 is consistent with how the term "instructs" (and variants) was used by technologists in the relevant area of art during the approximate time period of October 2005.

63. For example, here is a definition from an engineering dictionary bearing a copyright date of 2004:

"instruction...A command or statement in a computer program or routine" (excerpted from Steven M. Kaplan, *Wiley Electrical And Electronics Engineering Dictionary*, Page 377, 2004; page bearing Bates number CEV-0035878).

64. Indeed, the subject term even carries a similar, and consistent, meaning in general conversation. For instance, consider:

"instruct...to order or direct" "Syn[onym] command" (excerpted from Michael Agnes, Editor In Chief, *Webster's New World College Dictionary*, Page 741, 2004;

page bearing Bates number CEV-0035867) (clarification in square brackets added here).

65. As part of their argument, Defendants state: "[t]he asserted claims recite an 'upload option that instructs [a component] to confine automatic picture upload to periods without potential [or potentially increased] cellular network access fees.'" (Defendants' Opening Claim Construction Brief, Page 7, Line 24 through Page 8, Line 2, November 21, 2022) (material in second and third square brackets in the original) (underscoring in the original). But Defendants are incorrect for at least the reason that the word "option" does not even appear in Claim 5 of the '472 Patent.

66. Finally, I note that the Declaration from Defendants' expert Dr. Garlick does not provide any opinion or support for Defendants' contention that the term "instructs" is somehow indefinite.

"The Device"

67. Defendants contend that "the phrase 'the device' in the context of the '761 patent claims is indefinite" (Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 44, November 21, 2022).

68. The phase "the device" appears once in the entire ensemble of patent claims that have been asserted in the present litigation. In particular, this phrase appears in '761 Patent, asserted Claim 1 at Column 16, Line 67 where the patent claim recites, in part, "...instructs the device...".

69. In the context of the present dispute, and for at least the reasons detailed below, I am of the opinion that a POSITA would understand that the "device" is the "camera system" recited in the preamble portion of '761 Patent, Claim 1 (see, '761 Patent, Column 16, Line 58).

70. To begin the analysis, please consider these this express recitation from a portion of '761 Patent, asserted Claim 1:

> "receive, via the touch sensitive display, a user selection of an upload option that *instructs the device* to confine *automatic picture upload* to periods without potential cellular network access fees" (excerpted from '761 Patent, Column 16, Line 66 through Column 17, Line 2) (emphasis via italics added here).

71. And, in this context, please also consider the following disclosure from the patent specification:

> "For example, *the inventive camera system can be instructed to automatically send the pictures* to an email account, internet picture hosting site, web-based photo printing site, the user's internet-connected home computer (when he is on vacation, for instance), etc." ('472 Patent, Column 13, Lines 22-27) (parenthetical insertion in the original) (emphasis via italics added here).

72. Then consider the following teaching from the specification of the patents-in-suit, that describes the same operation from the claim that "the device" is "instructed" to perform:

> "Additionally, the inventive camera system is preferably operable so that the automatic connection is made only at certain times of the day or weekends, etc., so as to confine picture transmission to periods of low network usage or periods of cheaper network access, etc." ('472 Patent, Column 13, Lines 3-7).

73. In my opinion, this language from '761 Patent asserted Claim 1 in concert with the above disclosure from the patent specification confirm that "the inventive camera system" is "the device" that is "instructed to confine automatic picture upload" as recited in Claim 1 of the '761 Patent.

74. As similar corroborating evidence that "the device" is necessarily the "camera system", recall from above that the phrase "the device" appears in the '761 Patent claim recitation "instructs the device". Thus, it is appropriate to examine other parts of the specification of the patent to see what "device" is disclosed as being "instructed". To this end, please consider these additional teachings from the specification of the patents-in-suit:

a. "...instruct the camera..." (excerpted from '472 Patent, Column 5, Lines 36-37).

b. "...instruct the camera..." (excerpted from '472 Patent, Column 5, Line 63 through Column 6, Line 2).

c. "...the inventive camera system is operable for being instructed..." (excerpted from '472 Patent, Column 12, Line 62 through Column 13, Line 1).

d. "...the inventive camera system can be instructed…" (excerpted from '472 Patent, Column 13, Lines 22-27).

75. In short, these additional teachings from the specification confirm that "the camera" (a.k.a. "the inventive camera system") is "the device" that is recited in Claim 1 of the '761 Patent.

76. As still further support, during prosecution of the application that matured into the '761 Patent-in-suit, CEV made the following representation to the U.S. Patent & Trademark Office related to three claims that were pending at that time:

"However, a person of ordinary skill in the art at the time of the invention would immediately see the disclosure of menu options in Applicant's specification and the various functions of *the device claimed*, and recognize how to include those claimed functions as part of menus in *the device*."

(Patent Application No. 14/950,370; Response To Non-Final-Office Action, Page 11, Lines 28-31, December 20, 2017; page bearing Bates number CEV-0030680) (both emphases via italics added here).

77. The three independent claims that were pending when the above statement was made were preliminarily numbered Claim 21, Claim 30, and Claim 38 (see, Patent Application No. 14/950,370; Response To Non-Final-Office Action, Page 11, Lines 26-27, December 20, 2017; page bearing Bates number CEV-0030680). These three claims begin with the respective language reproduced below:

a. "A camera system comprising:" (excerpted from pending Claim 21) (Patent Application No. 14/950,370; Response To Non-Final-Office Action, Page 4, Line 4, December 20, 2017; page bearing Bates number CEV-0030673).

b. "A camera system comprising:" (excerpted from pending Claim 30) (Patent Application No. 14/950,370; Response To Non-Final-Office Action, Page 6, Line 7, December 20, 2017; page bearing Bates number CEV-0030675).

c. "A camera system comprising:" (excerpted from pending Claim 38) (Patent Application No. 14/950,370; Response To Non-Final-Office Action, Page 8, Line 4, December 20, 2017; page bearing Bates number CEV-0030677).

78. Thus, in each of these three instances, it appears that CEV equated "the device" with the claimed "camera system".

79. As further support, I considered that the '761 Patent and the '472 Patent are both asserted in the present litigation, the '761 Patent and the '472 Patent are directed to similar subject matter, and both patents share identical titles and the same inventor. As such, it is useful to

compare certain language appearing in the claims from the '761 Patent to similar language that appears in the claims from the '472 Patent.

80. First, consider this language from the '761 Patent claims:

a. "...a user selection of an upload option that instructs *the device* to confine automatic picture upload to periods..." (excerpted from '761 Patent, Claim 1 at Column 16, Line 66 through Column 17, Line 2) (emphasis via italics added here).

b. "...a user selection of an upload option that instructs *the device* to confine automatic picture upload to periods..." (excerpted from '761 Patent, Claim 17 at Column 18, Lines 43-46) (emphasis via italics added here).

81. Next, I considered this language from the '472 Patent claims also asserted in this matter:

a. "...a user selection of an upload option that instructs *the camera system* to confine automatic picture upload to periods..." (excerpted from '472 Patent, Claim 1 at Column 17, Lines 14-19) (emphasis via italics added here).

b. "...a user-selectable input that instructs *the camera system* to confine automatic picture upload to periods..." (excerpted from '472 Patent, Claim 5 at Column 18, Lines 12-15) (emphasis via italics added here).

82. So, as above, examination of parallel language in these companion patent claims suggests to the POSITA that "the camera system" is "the device" that is recited in Claim 1 of the '761 Patent.

83. In short, it is my opinion, based on the analysis detailed above, that it would be understood by the POSITA that "the device" recited in '761 Patent, Claim 1 (see, '761 Patent,

Column 16, Line 67) is clearly referring to the "camera system" recited in the preamble portion of '761 Patent, Claim 1 (see, '761 Patent, Column 16, Line 58).

My Opinions Relating To "Cellular Network Access Fees"

84. The phrase "cellular network access fees", as disclosed and claimed in the patents-in-suit, refers to data upload fees specifically for the upload. Generally speaking, assuming that the other claim limitations are also met, in the asserted claims from the '761 Patent the user of the inventive technology requires avoidance of picture uploading during any time period where there is a possibility of the cellular network provider charging him a data upload fee specifically for the upload. And, assuming that the other claim limitations are also met, in the asserted claims from the '472 Patent the user of the inventive technology requires avoidance of picture uploading during any time period where there is a possibility of the cellular network provider charging a data upload fee more than the normal data upload fee.

a. It is, of course, well known that there are not generally periods when the customer has unfettered free access to all of the services provided by the cellular network. So, the claimed "cellular network access fees" are necessarily referring to data upload fees, not to one's normal, fixed monthly plan charge.

b. For instance, notice that the asserted claims generally recognize that the magnitude of fees might vary from one period to the next. In contrast, a fixed monthly plan charge on a provider plan generally does not vary from one upload period to the next.

c. The asserted claims also contemplate that the decision on whether to upload or not upload depends on information received via the cellular interface. But, fixed monthly plan charge information is not generally provided in that manner.

85. In addition, consider, for instance, these teachings from the patent specification that support the claim language:

a. "Additionally, the inventive camera system is preferably operable so that the automatic connection is made only at certain times of the day or weekends, etc., so as to confine picture transmission to periods of low network usage or *periods of cheaper network access*, etc." ('472 Patent, Column 13, Lines 3-7) (emphasis via italics added here).

b. "Cellular service providers typically charge a fee for internet access or emailing and so an automatic feature to connect to the net or send email for the purposes of transmitting pictures *can improve revenue generation for these companies*." ('761 Patent, Column 14, Lines 31-35) (emphasis via italics added here).

86. Also recall that during prosecution of the application that matured into the '761 Patent-in-suit, CEV made the following representation to the U.S. Patent & Trademark Office:

"...Mr. Lesko proposed that (in the interest of compact and efficient prosecution) an amendment to the claims should be filed in the present case to include the allowable subject matter from the '736 Application, which would result in prompt allowance. The Examiner agreed and instructed Applicant to file a supplemental amendment herein." (Patent Application No. 14/950,370; Supplemental Amendment To The Claims; Interview Summary And Remarks; Page 9, Lines 5-10; February 8, 2018; page bearing Bates number CEV-0030666) (parenthetical insertion in the original).

87. Note that the recitation of "the '736 Application" refers to Patent Application No. 15/188,736—that matured into related U.S. Patent No. 9,936,116 by the same inventor as the patents-in-suit in the present litigation.

88. Also note that the claims language "confine automatic picture upload to periods without potential cellular network access fees" appears in the claims of the '116 Patent. Subsequently, this same language was copied over into the amended claims of the application that matured into the '761 Patent-in-suit in order to facilitate allowance of those claims.

89. In fact, during prosecution of the claims that ultimately issued in the related '116 Patent, CEV made the following representations to the U.S. Patent & Trademark Office:

a. "Applicant pointed to at least Paragraph [0038] of the specification, which discusses 'confin[ing] picture transmission to periods of low network usage or periods of cheaper network access.' Applicant explained to the Examiner that this statement is applicable to cellular uploads as claimed, and the Examiner agreed." (Patent Application No. 15/188,736; Amendment After Final Office Action; Page 6, Lines 9-12; December 11, 2017; page bearing Bates number CEV-0031291) (material in both square brackets in the original).

b. "Applicant distinguished the present claims from a 'timer.'" (Patent Application No. 15/188,736; Amendment After Final Office Action; Page 6, Line 15; December 11, 2017; page bearing Bates number CEV-0031291).

c. "Applicant's invention...offers many explicit benefits over a simple timer. For example, a simple timer for picture upload (i.e., setting the upload for 8 PM) would still result in charges to a user's account if the user is 'roaming' at the designated time that the upload begins. In short, a timer does not adequately prevent roaming or other network charges that can be incurred during photo uploads." (excerpted from Patent Application No. 15/188,736; Amendment After Final Office Action;

Page 6, Lines 20-25; December 11, 2017; page bearing Bates number CEV-0031291) (parenthetical insertion in the original).

d. "...Rothschild's upload is completed by an intermediate computer...nor is it concerned with confining the uploads to periods of cheaper cellular network access (avoiding roaming charges, etc.), as part of the automatic upload process" (excerpted from Patent Application No. 16/663,742; Applicant-Initiated Interview Summary; December 12, 2017; bearing Bates number CEV-0031284) (parenthetical insertion in the original).

e. "Montulli...describes background art purportedly addressed to uploading images using the cellular network. Avoiding network access fees (not roaming, etc.) is not described as a condition for automatic upload." (excerpted from Patent Application No. 16/663,742; Applicant-Initiated Interview Summary; December 12, 2017; bearing Bates number CEV-0031284) (parenthetical insertion in the original).

90. So, in the above-described examples in Paragraphs 85-89, one type of period where the inventive technology can be prevented from picture uploading is when "roaming" occurs.

91. Data roaming fees are one example of well-known potential cellular network access fees and potentially increased cellular network access fees expressly mentioned in the intrinsic record. At the time of the invention, it was well known that uploads during data roaming may (but do not always) result in cellular network access fees incurred from sending data over the network used when roaming. Therefore, it is my opinion that a POSITA would have been well aware of the existence and significance of potential fees and of potentially increased fees relating to certain data uploads.

92. In fact, Dr. Garlick also recognized that data roaming fees are potential fees that can be incurred from uploads, but that are not always incurred:

"Q. So if the user is uploading data while data roaming, is it possible to incur a data roaming fee as a result?

A. It's my understanding that these have largely been eliminated, but the answer is for a cellular carrier, I guess, that provided that capability and for a user that performed that operation, it's my understanding that *there could be additional fees associated with that*." (Garlick Deposition, Pages 175-176) (emphasis via italics added here).

"Periods Without Potential Cellular Network Access Fees"

93. Defendants contend that the phrase "periods without potential cellular network access fees" is indefinite. (see, Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 50, November 21, 2022).

94. The phrase "periods without potential cellular network access fees" appears once in Claim 1 of the '761 Patent-in-suit. In particular, this phrase appears in '761 Patent, Claim 1 at Column 17, Lines 1-2.

95. To begin, and as explained in the section above, the phrase "cellular network access fees" as disclosed and claimed in the patents-in-suit refers to data upload fees specifically for the upload. Thus, the phrase "periods without...cellular network access fees" refers to times and situations when the customer is not being charged a data upload fee.

96. Defendants' expert Dr. Garlick seems to agree when he admits that "Indeed, because cellular network operators run for-profit businesses, it is not possible for a typical customer of a cellular network to have a 'period without potential cellular network access fees.'"

(Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 53, November 21, 2022).

97. Next, please consider the word "potential" as it appears in the context of the asserted claims. In particular, '761 Patent, Claim 1 recites in part "a user selection of an upload option that instructs the device to confine automatic picture upload to periods without potential cellular network access fees" ('761 Patent, Claim 1 at Column 16, Line 66 through Column 17, Line 2). That is, the user selects an option on his device that will avoid possible data upload fees.

98. Notice that the user does not even have to be consciously aware that he is in a period with potential cellular network access fees such as, for example, roaming fees. The device and the cellular network provider figure that out on their own. The user simply has an option that avoids potential cellular network access fees by preventing uploading during such periods.

99. Notice also that the above-described option is a characteristic of the claimed system independent of whatever cellular network plan is in place. Indeed, the inclusion of the claim word "potential" has the effect of making the corresponding claim independent of any cellular network plan.

100. Notice also that the option is a characteristic of the system independent of whether a user ultimately chooses it. According to the claim, the option exists, it exists for a reason, and it will result in a specific operation if selected, but the claim is a system claim, not a method claim.

"Periods Without Potentially Increased Cellular Network Access Fees"

101. Defendants contend that the phrase "periods without potentially increased cellular network access fees" is indefinite. (see, Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 64, November 21, 2022).

102. The phrase "periods without potentially increased cellular network access fees" appears twice in asserted Claim 1 of the '472 Patent-in-suit. In particular, this phrase appears in '472 Patent, asserted Claim 1 at Column 17, Lines 18-19; and in '472 Patent, asserted Claim 1, Column 17, Lines 28-29.

103. The phrase "periods without potentially increased cellular network access fees" appears twice in asserted Claim 5 of the '472 Patent-in-suit. In particular, this phrase appears in '472 Patent asserted Claim 5 at Column 18, Lines 14-15; and in '472 Patent asserted Claim 5 at Column 17, Lines 26-27.

104. The phase "period without potentially increased cellular network access fees" appears once in asserted Claim 5 of the '472 Patent-in-suit. In particular, this phrase appears in '472 Patent, asserted Claim 5 at Column 18, Lines 29-30.

105. To begin, and as explained earlier, the phrase "cellular network access fees" as disclosed and claimed in the patents-in-suit refers to data upload fees specifically for the upload.

106. Thus, the phrase "periods without...increased cellular network access fees" refers to times and situations when the customer is not being charged a data upload fee above and beyond their normal data upload fee. Consider this specific example, as revealed to the U.S. Patent & Trademark Office during the prosecution of the application that matured into the '472 Patent-in-suit:

> "'Periods of cheaper network access,'...can be determined via 'status of equipment' because the device receives cellular network information from equipment on the cellular network. As an example...equipment on the network indicates to the cellular phone (through its cellular interface) that the device is roaming on a more-expensive non-provider network. This roaming period would *not* be 'one of the periods without potentially

> increased cellular network access fees,' and upload is prevented during this particular period."

(excerpted from Patent Application No. 16/663,742; Response To Non-Final Office Action; Page 9, Lines 24-30; June 11, 2021; page bearing Bates number CEV-0010978) (parenthetical insertion in the original) (emphasis via italics in the original).

107. Next, please consider the word "potentially" as it appears in the context of the asserted claims. In particular, '472 Patent, Claim 1 recites in part "a user selection of an upload option that instructs the camera system to confine automatic picture upload to periods without potentially increased cellular network access fees" ('472 Patent, Claim 1 at Column 17, Lines 14-19). Similar language appears in '472 Patent, Claim 5 at Column 18, Lines 12-15. That is, the user selects an option on their device that will avoid the possibility of being charged a data upload fee above and beyond their normal data upload fee.

108. Asserted Claim 1 from the '472 Patent also uses this same phrase in that claim when it recites "the upload is allowed because the system is within one of the periods without potentially increased cellular network access fees, as determined using data from the cellular interface" ('472 Patent, Claim 1 at Column 17, Lines 27-32). Similar language appears in '472 Patent, Claim 5 at Column 18, Lines 27-30). And, the device is to avoid the possibility of being charged a data upload fee above and beyond the normal data upload fee.

109. Notice that the user does not even have to be consciously aware that he is in a period with potentially increased cellular network access fees such as, for example, roaming fees. The device and the cellular network provider figure that out on their own. The user simply has an option that avoids potentially increased cellular network access fees by preventing uploading during such periods.

110. Notice also that the above-described option is a characteristic of the claimed system independent of whatever cellular network plan is in place. Indeed, the inclusion of the claim word "potentially" has the effect of making the corresponding claim independent of any cellular network plan.

111. Notice also that the option is a characteristic of the system independent of whether a user ultimately chooses it. According to the claim, the option exists, it exists for a reason, and it will result in a specific operation if selected, but the claim is a system claim, not a method claim.

112. In his Declaration, Defendants' expert Dr. Garlick suggests that one is unable to "(1) determine which situations qualify as potentially increased fees" (Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 65, November 21, 2022) (parenthetical insertion in the original).

113. However, one place where CEV provided express guidance on this topic is where CEV explained to the U.S. Patent & Trademark Office in the context of a related application: "...Rothschild's upload is completed by an intermediate computer...nor is it concerned with confining the uploads to periods of cheaper cellular network access (avoiding roaming charges, etc.), as part of the automatic upload process" (excerpted from Patent Application No. 16/663,742; Applicant-Initiated Interview Summary; December 12, 2017; bearing Bates number CEV-0031284) (parenthetical insertion in the original).

114. Further, in my opinion, the POSITA would have clearly understood that the phrase "potentially increased" is not a term of degree.

a. The word "potentially" has a well understood meaning. Consider, as some examples, potentially storming or potentially problematic. In such instances, the word potentially makes it clear that there is at least the possibility that the described

thing will happen. But, an understanding of the word potentially does not require an evaluation of the exact mathematical probability of occurrence. In summary, the word potentially does not mandate any evaluation whatsoever of degree.

b. Similarly, the word "increased" by its plain and ordinary meaning covers any increase small or large, and it therefore does not mandate any evaluation whatsoever of degree.

c. Finally, combining the words potentially and increased (neither of which requires evaluation of degree) does not result in a phrase that somehow requires evaluation of degree.

115. Also in his Declaration, Defendants' expert Dr. Garlick suggests that one is unable to "(2) determine and measure how much potential increase of the network access fees is needed; and (3) determine the boundary regarding the amount of fees required to classify as 'potentially increased...fees.'" (Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 65, November 21, 2022) (parenthetical insertion in the original).

116. However, the plain English language of the claims themselves determine how much of an increase of the network access fees is needed.

a. It is well known that, by definition, any increase whatsoever qualifies as an increase. So, in the present context, any data upload fee above and beyond the normal fee that results from an upload qualifies as an increase.

b. In short, variations in the magnitude of the price difference may exist, but that is not unclear to the POSITA. Indeed, even an increase of only a single penny is still an increase based on the plain meaning of the word "increase."

c. Furthermore, the magnitude of the normal data upload fee to which the increase is being compared does not matter.

"Upload Of One Or More Pictures" & "Group Of Pictures"

117. Defendants contend that the claim "term 'upload...pictures' is indefinite". (Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 58, November 21, 2022). As part of his assertion, Defendants' expert Dr. Garlick contends that "a POSITA would not be able to ascertain with reasonable certainty what specific pictures are uploaded under what scenarios" (Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 55, November 21, 2022).

118. The phrase "upload of one or more pictures" appears in the '761 Patent asserted Claim 1 at Column 17, Line 4.

119. The phrase "upload...of a group of image sensor-captured pictures" appears in the '472 Patent asserted Claim 1 at Column 17, Lines 21-24.

120. The phrase "upload...of a group of image sensor-captured pictures" appears in the '472 Patent asserted Claim 5 at Column 18, Lines 17-20.

121. Defendants also contend that the claim "term 'group of...pictures' is indefinite". (Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 60, November 21, 2022).

122. The phrase "group of pictures" appears in the '761 Patent asserted Claim 1 at Column 17, Line 15.

123. The phrase "group of image sensor-captured pictures" appears in the '472 Patent asserted Claim 1 at Column 17, Lines 23-24.

124. The phrase "group of image sensor-captured pictures" appears in the '472 Patent asserted Claim 5 at Column 18, Lines 19-20.

125. It is apparent from the plain language of the patent claims asserted in the present litigation that the claimed uploading and the recited picture groups are related. Thus, for purposes of this present Declaration, these two phrases will be discussed together.

126. As relates to the '761 Patent-in-suit, consider the following recitation from '761 Patent, Claim 1 at Column 17, Lines 3-6: "automatically connect to a remote picture hosting service and cause an upload of one or more pictures stored in the non-volatile memory to the remote picture hosting service." Consider also the additional recitation from '761 Patent, Claim 1 at Column 17, Lines 15-16: "the group of pictures stored in the local memory to be uploaded to the remote picture hosting service."

127. Reading these recitations together, it is apparent to a POSITA from the plain language of '761 Patent, Claim 1 that "the group" recited at Column 17, Lines 15-16 is simply referring to the pictures recited at Column 17, Lines 3-6 that are to be uploaded to the remote picture hosting service (assuming, of course, that the remaining claim limitations are met).

128. The claim language "group of…pictures" when viewed in light of the intrinsic record informs the POSITA about the scope of the invention with reasonable certainty:

a. The group to be uploaded must include the "at least one picture" designated, as shown in the following recitation from '761 Patent, Claim 1 at Column 17, Lines 13-16: "an indication from the local memory that a user has elected an option to designate at least one picture from the group of pictures stored in the local memory...to be uploaded to the remote picture hosting service."

b. Also, while the "one or more pictures" must include the "at least one picture" designated from the "group" to be uploaded as specified at '761 Patent, Claim 1 at Column 17, Lines 13-16, the plain language "one or more pictures" at Column 17, Lines 3-6 indicates that the "group" to be uploaded can also include additional pictures.

c. And, because the controller is configured to cause an upload when the claim limitations are met, this would place an upper bound on the group equal to the "pictures stored in the non-volatile memory" ('761 Patent, Claim 1 at Column 17, Lines 4-5) at the time that the upload occurs.

129. In short, a POSITA would understand the scope of the "group" recited in '761 Patent, Claim 1.

130. In my opinion, a POSITA would also recognize that "the non-volatile memory" at '761 Patent, Claim 1, Column 17, Lines 4-5 is also referred to as a "a non-volatile local memory" at '761 Patent, Claim 1 at Column 16, Line 62.

131. I also considered the plain language of '761 Patent, Claim 1 as it relates to the uploading itself. In particular, from the plain language in Column 17, Lines 3-17 it is apparent to a POSITA that a correspondingly claimed upload only occurs if three conditions are met. One of those conditions involves the designation of at least one picture from the group of pictures to be uploaded (see, '761 Patent, Claim 1 at Column 17, Lines 13-17).

132. Thus, in the system recited in '761 Patent, Claim 1, a POSITA would understand that the claim itself states that at least one picture has to be designated or else the corresponding group does not get uploaded.

133. In fact, Defendants' expert Dr. Garlick appears to agree with this particular conclusion when he states that "The '761 patent claims...seem to suggest that selecting an image from a 'group' is sufficient to condition the upload of the 'group' of images." (excerpted from Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 56, November 21, 2022). Of course, this necessarily assumes that the other limitations of the corresponding claim are also met.

134. Moreover, Dr. Garlick admitted in his testimony that he arrived at this same conclusion simply by reading the plain language of the claims:

"A. The group of pictures is uploaded during a period where all three conditions are met. One of those conditions is that at least one picture has been selected. So once at least one picture is selected, a group of pictures is uploaded.

Q. And of course the other two conditions have to be met as well, right?

A. That's my understanding.

Q. That's from reading the claim language?

A. Yes.

Q. The plain language of the claim?

A. Well, during periods in which all three of the following conditions are met, then the things at the start of (f)(ii) will occur is my reading." (Garlick Deposition, Pages 194-195).

135. Next, as relates to the '472 Patent-in-suit, I considered the following recitation from '472 Patent, Claim 1 at Column 17, Lines 21-24: "enable an upload...of a group of image sensor-captured pictures stored in the local memory". A POSITA would understand from the plain language of '472 Patent, Claim 1 that "the group" (in '472 Patent, Claim 1 at Column 17, Lines

36-37) is simply referring to the pictures that are to be uploaded (at '472 Patent, Claim 1 at Column 17, Lines 21-24) (assuming, of course, that the remaining claim limitations are met).

136. The '472 Patent claim language "group of…pictures" when viewed in light of the intrinsic record informs the POSITA about the scope of the invention with reasonable certainty.

a. The group to be uploaded must include the "at least one image sensor-captured picture" designated through the touch sensitive display, as shown in the following recitation from '472 Patent Claim 1 at Column 17, Lines 33-37: "at least one image sensor-captured picture stored in the local memory…designated through the touch sensitive display."

b. Also the plain language "as part of" at Column 17, Line 36 indicates that the "group" to be uploaded can also include additional pictures.

c. And, because the controller is configured to enable an upload when the claim limitations are met, this would place an upper bound on the group equal to the "image sensor-captured pictures stored in the local memory" ('472 Patent, Claim 1 at Column 17, Lines 23-24) at the time the upload occurs.

137. In short, a POSITA would understand the scope of the "group" recited in '472 Patent, Claim 1.

138. Now, consider the plain language of '472 Patent, Claim 1 as it relates to the uploading itself. From the plain language in Column 17, Lines 26-38 it would be apparent to a POSITA that a correspondingly claimed upload only occurs if three conditions are met. One of those conditions is "at least one image sensor-captured picture stored in the local memory has been designated through the touch sensitive display as part of the group of pictures to be uploaded to the picture hosting service" ('472 Patent, Claim 1 at Column 17, Lines 34-38).

139. Thus, in the system recited in '472 Patent, Claim 1, a POSITA would understand that the claim itself states that at least one picture has to be designated through the touch sensitive display or else the corresponding group does not get uploaded.

140. Defendants' expert Dr. Garlick appears to agree with this particular conclusion when he states that "The '472 patent claims...seem to indicate that selecting an image from a 'group' is sufficient to condition the upload of the 'group' of images." (excerpted from Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 56, November 21, 2022). Of course, this necessarily assumes that the other limitations of the corresponding claim are also met.

141. The "upload" limitations and the "group" limitations in '472 Patent, Claim 5 mirror those same limitations in '472 Patent, Claim 1. Thus, the analysis and conclusions detailed above for '472 Patent, asserted Claim 1 are also germane for '472 Patent, asserted Claim 5.

142. It is also my opinion that Defendants' expert Dr. Garlick incorrectly characterizes the teachings of the patents-in-suit when he states:

> "The following is the only possible relevant section of the specification: 'The camera system...includes the ability for the user to indicate to the camera which pictures to offload so that the camera offloads only those pictures that are so indicated by the user.' ('761 patent at 11:64-12:1)." (Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 57, November 21, 2022) (ellipses in the original) (parenthetical insertion in the original).

But, notice that Dr. Garlick ignored the word "preferably" that actually appears in the material that he purportedly referenced from '761 Patent, Column 11, Line 64 through Column 12, Line 1. In fact, the entirety of that sentence in the patent actually states "The camera system *preferably*

includes the ability for the user to indicate to the camera which pictures to offload so that the camera offloads only those pictures that are so indicated by the user." ('761 Patent, Column 11, Line 64 through Column 12, Line 1) (emphasis via italics added here). And the fact that CEV included the word "preferably" in the patent specification disclosure reproduced here helps to inform the POSITA that the scenario described in that sentence is simply one of several possibilities.

143. Indeed, consider the express teachings in the '761 Patent specification that appear in the sentence immediately before the material relied upon by Dr. Garlick, and that explain various ways in which the inventive camera system can do offloading or uploading. Some of these other ways include "...when a set of predetermined conditions, such as day, time, number of pictures to offload, etc., are met" (excerpted from '761 Patent, Column 11, Lines 61-64). Thus, the inventive camera system can use a number of different conditions to trigger picture offloads or uploads, not just the particular "designate at least one picture from the group of pictures" condition that is claimed in '761 Patent, asserted Claim 1. Similarly, the inventive camera system can use a number of different conditions to trigger picture offloads or uploads, not just the particular "at least one image sensor-captured picture stored in the local memory has been designated through the touch sensitive display as part of the group" condition that is claimed in '472 Patent, asserted Claim 1 and in '472 Patent, asserted Claim 5.

144. Defendants' expert Dr. Garlick also inaccurately describes the teachings of the '761 Patent when he states: "The '761 patent specification also refers to a camera system sending pictures 'when it has a predetermined number of pictures' ('761 patent at 13:14-15)..." (excerpted from Declaration Of Dr. Ryan Garlick In Support Of Defendants' Opening Claim Construction Brief, Paragraph 58, November 21, 2022) (parenthetical insertion in the original).

145. But, as detailed above in this present Declaration, the specifications of the patents-in-suit teach a number of different situations with various upload conditions, not just "when it has a predetermined number of pictures" as incorrectly asserted by Defendants' expert Dr. Garlick.

146. The '472 Patent specification also recites several ways for the user to make selections (such as selection of menus, modes, and options), including, for example, using voice recognition (see, for example, '472 Patent, Column 5, Lines 6-25; Column 2, Lines 38-44; Column 8, Lines 14-18) using gaze tracking (see, for example, '472 Patent, Column 2, Lines 19-21; Column 2, Lines 38-44; Column 8, Lines 14-18; Column 8, Lines 35-50), and using a touchpad (see, for example, '472 Patent, Column 9, Lines 32-46) and not just by using the "touch sensitive display" that is claimed in '761 Patent, asserted Claim 1, in '472 Patent, asserted Claim 1, and in '472 Patent, asserted Claim 5

"Indication From The Local Memory"

147. Defendants state that "[t]he specification fails to shed light on the meaning of the disputed claim term 'indication from the local memory.'" (Defendants' Opening Claim Construction Brief, Page 13, Lines 16-17, November 21, 2022). I am of the opinion that the meaning of this term is clear to a POSITA.

148. First, the language of the claims provides context for the disputed term. The word "indication" is used twice in '761 Patent, Claim 1, both times reciting that the indication is received by the controller:

a. "an indication that the system is connected to the internet via the cellular interface" ('761 Patent, Claim 1 at Column 17, Lines 11-12).

b. "an indication from the local memory that a user has elected an option to designate at least one picture from the group of pictures stored in the local memory to be

uploaded to the remote picture hosting service" ('761, Claim 1 at Column 17, Lines 13-17).

149. In the context of '761 Patent, Claim 1, it is my opinion that a POSITA would understand that the recited indication is respective confirmation (a) "that the system is connected to the internet via the cellular interface" and (b) "that a user has elected an option to designate at least one picture from the group of pictures stored in the local memory to be uploaded to the remote picture hosting service".

150. In addition, the fact that the indication is received by the controller confirms that each recited indication is some sort of proof in the form of an electronic signal.

151. Furthermore, a review of the patent specification confirms that the inventor uses the word "indication" (and variants) in ordinary parlance, and does not provide any special definition for those terms.

152. Moreover, the Defendants do not identify or provide any citation in the patent specification purportedly comprising a special definition of those terms.

153. The intrinsic record also reveals that, during prosecution of the application that matured into the '761 Patent-in-suit, CEV made the following representation to the U.S. Patent & Trademark Office regarding the term "indication":

> "And the fact that an *'indication' (i.e, some sort of proof in the form of an electronic signal)* of a met condition was received would immediately be understood by a skilled artisan without the need for undue experimentation."

(Patent Application No. 14/950,370; Response To Non-Final-Office Action, Page 12, Lines 13-15, December 20, 2017; page bearing Bates number CEV-0030681) (parenthetical insertion in the original) (emphasis via italics added here).

154. Indeed, in my experience in the electronics world, a POSITA would understand that an "indication" as disclosed and claimed in the patents-in-suit generally comprises some sort of proof in the form of an electronic signal. And, CEV's representation reproduced immediately above in Paragraph 153 is consistent with the definition and the usage that I have heard employed by the POSITA in this area of endeavor.

155. Defendants go on to argue that "[a] 'indication' can refer to 'something (as a signal, sign, suggestion) that serves to indicate.'" (Defendants' Opening Claim Construction Brief, Page 14, Lines 2-3, November 21, 2022) (parenthetical insertion in the original).

156. Then, Defendants incorrectly assert that "a storage system does not provide indications" (Defendants' Opening Claim Construction Brief, Page 14, Line 5, November 21, 2022).

a. However, using Defendants' own definition of "indication" in Paragraph 155 above, a POSITA would surely agree that a memory as disclosed and claimed in the patents-in-suit stores a "signal", a "sign", or a "suggestion" "that serves to indicate". Thus, data stored in such a memory is an "indication" even under Defendants' own definition because said data clearly constitutes an electronic signal that serves to indicate something.

b. In addition, consider certain of the materials incorporated by reference into the disclosure of the patents-in-suit. As explained above in Paragraphs 40-42 of this present Declaration, a portion of those materials includes the Sensory RSC-164 chip family. To this end, the data book for the RSC-164 family was marked as Exhibit PX 0011 during the Garlick Deposition. Figure 1 appearing on Page 2 of this data book is labeled in part with the caption "RSC-164 Block Diagram". In

this block diagram there is shown bidirectional communication paths that can be employed by external components (such as memory) to exchange information back and forth from such componentry to the RSC-164, and vice versa. This illustrates, for example, that an exemplary controller can receive data from an external memory. And, as explained above, said data constitutes an indication as disclosed and claimed in the patents-in-suit.

157. During his deposition, Dr. Garlick explained that in his own personal experience user selected options result in data stored in memory, and that this data stored in memory is ultimately passed on through an order system or collected in an email and sent to production. In particular, Dr. Garlick testified:

a. "Then code will determine which options have been selected…that information will be stored in a database, stored in a memory object, and ultimately passed on through the order system so that the people who build the frame can know the options that were chosen." (excerpted from Garlick Deposition, Pages 71-72).

b. "The user selects options…The data is stored associated with those user options and collected in an email that's sent to production." (excerpted from Garlick Deposition, Page 83).

158. So, according to Dr. Garlick's testimony, the memory is storing data that indicates how production is to occur, thereby meeting Defendants' own definition of "indication".

159. Defendants also contend that "[a] POSITA would wonder what, exactly, is that 'something' from a *passive memory storage* that can serve to indicate". (Defendants' Opening Claim Construction Brief, Page 14, Lines 5-7, November 21, 2022) (emphasis via italics added here). But, for one thing, the specification of the patents-in-suit never states that the memory is

"passive". Moreover, the claims do not recite that the memory is either passive or active, but are instead silent on this point.

160. In sum, I disagree with the Defendants' contention that the claim term "indication from the local memory" is indefinite.

Signed under penalty of perjury this 12th day of December, 2022.

By: David W. Hughes

David W. Hughes

EXHIBIT 1 TO THE EXPERT DECLARATION OF DAVID W. HUGHES – Dr. Hughes C.V.

BIOGRAPHICAL SKETCH

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Education

Bachelor Of Electrical Engineering
Georgia Institute Of Technology, 1975

Master Of Science, Electrical Engineering
Georgia Institute Of Technology, 1976

Doctor Of Philosophy, Electrical Engineering
Georgia Institute Of Technology, 1980

Employment History

Latrobe Steel Company - Latrobe, Pennsylvania
Laborer (Summers), 1972-1974

Georgia Institute Of Technology - Atlanta, Georgia
Graduate Research Assistant, 1975-1980

Motorola Semiconductor Products Sector - Mesa, Arizona
Principal Staff Engineer, 1980-1985

Georgia Tech Research Institute - Atlanta, Georgia
Senior Research Engineer, 1985-1991

McDonald, Withers & Hughes, Inc. - Atlanta, Georgia
Principal, 1991-1994

McDonald & Hughes, Inc. - Atlanta, Georgia
Principal, 1994-1995

Hughes & Associates - Atlanta, Georgia; Huntsville, Alabama
President, 1995-Present

Experience Summary

Is presently the founding president of an engineering consulting and intellectual property firm which specializes in proprietary technologies. Assists the client in creating, protecting and positioning his technology assets for maximum economic benefit. Works extensively with patents and other forms of intellectual property. Improves the interface between patent attorneys, technologists and business people. Serves as an expert in patent and product litigation.

While at the Georgia Tech Research Institute, conducted research on the design, fabrication and characterization of gallium arsenide integrated devices.

Engineered Motorola's oxide-isolated, high voltage bipolar process. Built the world's first 100-mm, dielectrically-isolated production circuits. Helped design and implement new process control test dice for linear bipolar flows. Compared methodologies for sidewall isolating epitaxial islands. Supervised the design of a vehicle to measure stresses induced in silicon chips. Worked on power transistors for use with a bimos flow. Developed thin film resistors for use with data conversion products. Submitted 28 patent disclosures concerned with semiconductors and numerous other disclosures discussing complementary technologies. Holds the three fundamental patents on Motorola's chromium-silicon thin film manufacturing process.

While a graduate student at Georgia Tech, was engaged in extensive contracting with the United States Department Of Energy. Developed source of multiply-charged atmospheric ions. Invented advanced thermionic ion sources. Measured electron impact ionization cross sections. Supervised undergraduate and graduate laboratory assistants. Prepared numerous technical reports and presentations.

Current Fields Of Interest

Creation and positioning of intellectual properties in order to yield the maximum economic return to the client.

Serving as an expert in patent, product and trade secret litigation.

Selected Clients

Amoco

Avantek

Bailey Controls

Becton Dickinson

Broadcom

Calcomp

Cincinnati Electronics Corporation

Control Data Corporation

Delco

Dionex

Dow Chemical

Emory University

ETA Systems

General Electric

GTE

Hamilton Standard

Harris Corporation

Hewlett Packard

Honeywell

Hughes Aircraft

IBM

ITT

Lemelson Foundation

Lexmark International

Litton

Loral

Marlow Industries

Maxtor Corporation

Medtronic Micro-Rel

Milliken Chemical

Motorola

Murata

Northern Telecom

Northrop Grumman

Raychem Corporation

Rockwell International Corporation

Rohm

Semtech Corporation

Spectra-Physics

The Weather Channel

TRW

United Technologies Corporation

Unitrode

Registrations, Professional Affiliations And Special Honors

Engineer-In-Training Certification, 1975

Sigma Xi Award For The Outstanding Dissertation In Engineering, 1980

Motorola Engineering Achievement Award, 1981

Motorola Award Of Excellence, June 1981

Motorola Award Of Excellence, January 1983

Motorola Award Of Excellence, October 1983

Senior Member, Institute Of Electrical And Electronics Engineers

Member, Eta Kappa Nu

Member, Phi Kappa Phi

Member, Sigma Xi

Member, Tau Beta Pi

Listed In *Who's Who Of American Inventors*

Listed In *Who's Who Executive And Professional Directory*

Listed In *Who's Who Among Executives & Professionals*

Listed In *Who's Who Of Professionals*

Listed In *Who's Who In Science And Engineering*

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